

Appl. No. 09/673,139  
Amendment dated July 27, 2004  
Reply to Office Action of January 27, 2004  
Attorney Ref. No.: 068800-0277860

## I. AMENDMENT

### IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1, 7, 9, 15, 18, and 23 are amended.

1. (Currently amended) A bone implant having a surface comprising a bioactive material, wherein:

(a) the bioactive material has incorporated therein ions from one or more of the groups of the periodic table consisting of groups IIA, IVA, VIIA and transition elements;

(b) the bioactive material is a material that is capable of promoting bone growth onto the bone implant; and

(c) the ions are incorporated into or onto the surface of the bone implant by ion beam implantation up to a maximum depth of 200 nm; and at a level whereby ongrowth onto the implant is enhanced as compared with unmodified bioactive material.

(c) the bioactive material is a material that is capable of promoting bone growth onto the bone implant.

2. (Original) The bone implant as claimed in claim 1, wherein the bioactive material comprises hydroxyapatite.

3. (Canceled)

4. (Previously presented) The bone implant as claimed in claim 1, wherein the ions are incorporated into the surface of the bone implant up to a maximum depth of 150 nm.

5. (Original) The bone implant as claimed in claim 4, wherein the ions are incorporated into the surface at depths ranging up to approximately 100 nm.

6. (Previously presented) The bone implant as claimed in claim 1 wherein the ions are present at a level of between  $1 \times 10^{10}$  and  $1 \times 10^{18}$  ions per  $\text{cm}^2$  of the surface.

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7. (Currently amended) The bone implant as claimed in claim 1, wherein the ions are selected from one or more groups of the periodic table consisting of groups IIA, IVB, VIB, VIIB, VIII, IB, IIB, IVA ~~AND~~ and VIIA.

8. (Previously presented) The bone implant as claimed in claim 7, wherein the ions comprise one or more of the following:

magnesium, calcium, strontium, titanium, chromium, manganese, iron, copper, zinc, silicon and fluorine ions.

9. (Currently amended) The bone implant as claimed in claim 7, wherein the ions incorporated into the surface of the bone implant are from one or more of the groups of the periodic table consisting of groups IIA, VIIB, IIB, IVA ~~AND~~ and VIIA.

10. (Previously presented) The bone implant as claimed in claim 1, wherein the ions comprise magnesium, manganese, zinc or silicon ions.

11. (Previously presented) The bone implant as claimed in claim 1 comprising a body portion coated with a bioactive material coating.

12. (Previously presented) The bone implant as claimed in claim 11, wherein the body portion is formed of a metal or a metal alloy.

13. (Previously presented) The bone implant as claimed in claim 1, wherein the bone implant substantially comprises a bioactive material.

14. (Previously presented) The bone implant as claimed in claim 13, wherein the bone implant is in granular form.

15. (Currently amended) A method of treating a bone implant having a surface comprising a bioactive material to improve the bone ongrowth properties of the bone implant comprising subjecting the bone implant to ion beam embedding thereby to incorporate ions into the surface up to a maximum depth of 200 nm from one or more of the groups of the periodic table consisting of groups IIA, IVA, VIIA and transition elements into the surface:

(i) up to a maximum depth of 200 nm into the surface; and

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(ii) at a level whereby ongrowth onto the implant is enhanced as compared with unmodified bioactive material.

16. (Original) The method as claimed in claim 15, wherein the bioactive material comprises hydroxyapatite.

17. (Canceled).

18. (Currently Amended) The method as claimed in claim 17 15, wherein the ions are incorporated into the surface up to a maximum depth of 150 nm.

19. (Original) The method as claimed in claim 18, wherein the ions are incorporated at depths ranging up to approximately 100 nm.

20. (Previously presented) The method as claimed in claim 15, wherein the ions are present at between  $1 \times 10^{10}$  and  $1 \times 10^{18}$  ions per  $\text{cm}^2$  of the implant surface.

21. (Previously presented) The method as claimed in claim 15, wherein the ions comprise one or more of the following:

magnesium, calcium, strontium, titanium, chromium, manganese, iron, copper, zinc, silicon and fluorine ions.

22. (Original) The method as claimed in claim 21, wherein the ions comprise one or more of the following:

magnesium, calcium, strontium, titanium, chromium, manganese, iron, copper, zinc, silicon and fluorine ions.

23. (Currently amended) The method as claimed in claim 21, wherein the ions incorporated into the surface of the bone implant are from one or more of the groups of the period table consisting of groups IIA, VIIB, IIB, IVA and VIIA.

24. (Original) The method as claimed in claim 23, wherein the ions comprise magnesium, manganese, zinc or silicon ions.

25. (Canceled)

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26. (Previously presented) The bone implant of claim 12 wherein the metal or metal alloy is titanium or titanium alloy.